Evaluation on Quality of Winter Pelts of Blue Frost Foxes

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Abstract　　Several statistic indexes including pelt weight, pelt area, skin thickness, length of hair, fineness of hair and hair density, were adopted in the evaluation of winter pelt quality of blue frost fox and their parents. Results showed that some indexes of qualitative characters of blue frost fox were the medium between blue fox and silver fox, and some were superior to them.

Key words: Blue frost fox, Winter pelt, Quality

Introduction

Blue frost fox is the hybridized offspring of male silver fox(*Vulvas fulvua*) and female blue fox(*Alopex lagopus*) by artificial insemination. Due to its special characters, blue frost fox has been recognized in commercial as a fur bearer since it was produced. The first blue frost fox was born in 1990 in China[1]. The color of blue frost fox is very similar to the silver fox except that the hair is shorter than that of silver fox[2]. The hair structure of blue frost fox is much closer to that of silver fox than to blue fox[3]. Hair bundles are large in blue fox. The largest number of hairs per bundle is about 60 without guard hairs, and the mean number about 35. The mean hair number per bundle is around 21 in silver fox and 26 in blue frost fox[3]. But very few studies on the evaluation of pelt quality in blue frost fox were conducted.

Materials and methods

Materials

All the pelts involved in this study were collected from Harbin Wildlife Breeding Farm of Heilongjiang Local & Animals Products Import & Export Company. 10 pelts were selected randomly in each species.

Methods

Pelt weight was measured with balance. Pelt area was measured with centimeter ruler. The length is measured from the nose tip to the tail base and pelt width from left belly edge to the right belly edge. The pelt area was then obtained by the formula $S=LW$ in which S stands for the pelt area, L for pelt length and W for pelt width.

Hair length of guard hair and under hair was measured with millimeter ruler directly. Pelt thickness was measured with slide clippers at places along midback line. Fineness of guard hair and underhair was measured with linear micrometer under microscope. Hair density was counted under microscope on the vertical section of skin with netmicrometer.

Results

Description of pelt characters

In general, the characters of blue frost fox pelts is combined that of blue fox and silver fox. The pelt size is closer to the silver fox and the face is more featured like blue fox. Ear length is intermediate[2]. They have the similar underhair density to that of blue fox, but a similar guard hair to silver fox. However, the guard hair is shorter compared to silver fox. The white tail tip seems like silver fox.

Macroscopically, the guard hairs of blue frost fox is silvered at the top part over underhair layer. Its middle part is white and root part gray. The under hair is blue gray. The pelt seems as a blue gray underhair layer is covered with thin frost. That's the reason we call the stain blue frost fox.

Pelt weight

The mean weight of pelt is 0.50±0.07 kg in blue frost fox, 0.55±0.08 kg in silver fox and 0.41±0.08 kg in blue fox. The difference significance tests illustrate that there is insignificant difference between blue frost fox and silver fox ($|t|=1.488<t_2=2.101$) and a significant difference between blue frost fox and blue fox ($|t|=2.679>t_2=2.101$).

Pelt area

The mean pelt area is 1334.38 ± 32.00 cm^2 in blue frost fox, 1521.52±61.11 cm^2 in silver fox and 1230.35±24.99 cm^2. The difference significance tests show that there is significant difference between blue frost fox and silver fox ($|t|=8.583>t_2=2.101$) and between blue frost fox and blue fox ($|t|=8.095>t_2=2.101$).

Pelt thickness

The mean pelt thickness is 1.2065±0.41 mm in blue frost fox, 1.4875±0.56 mm in silver fox and 1.4980± 0.36 mm in blue fox. The difference significance tests show that the difference is not significant between blue frost fox and silver fox ($|t|=1.283>t_2=2.101$) and between blue frost fox and blue fox ($|t|=1.685>t_2=2.101$).

Hair length

Table 1 shows the length data of guard hair and underhair measured from different places. Table 2 shows the data and difference significance between species.

Table 1. Length of guard hair and underhair and difference significance tests between different places in blue frost fox (n=15)

Hair type	Sampling place	Hair length (mm)	$|t|$&t_2	Difference significance
guard hair	body side	80.91 ± 6044	$|t|=13.75>t_2=2.084$	*
underhair	midback	48.15 ± 6.57		
Guard hair	body side	41.68 + 3.03	$|t|=8.27>t_2=2.084$	*
underhair	midback	30.09 ± 4.50		

Table 2. Length of guard hair in midback and the difference between species (n=15)

Hair type	Species	Hair length (mm)	$|t|$&t_2	Difference significance
guard hair	blue frost fox	48.15 ± 6.57	$|t|=21.09>t_2=2.084$	*
	silver fox	97.39 + 6.21		
underhair	blue frost fox	30.09 + 4.50	$|t|=11.79>t_2=2.084$	*
	silver fox	55.43 ± 7.21		
Guard hair	blue frost fox	48.15 + 6.57	$|t|=17.83>t_2=2.084$	*
	blue fox	81.67 ± 3.17		
underhair	blue frost fox	30.09 + 4.50	$|t|=10.47>t_2=2.084$	*
	blue fox	45.46 + 3.49		

* Difference is significant

Hair fineness

The data were shown in Table 3

Table 3. The data of hair fineness and difference significance tests between species (n=15)

hair type	species	hair length(mm)	$|t|$&t_2	Difference significance
guard hair	blue frost fox	86.52 ± 10.25	$|t|=1.02<t_2=2.084$	—
	silver fox	89.80 ± 7.02		
underhair	blue frost fox	15.26 ± 3.06	$|t|=4.00>t_2=2.084$	*
	silver fox	21.44 ± 4.80		
Guard hair	blue frost fox	86.52 ± 10.25	$|t|=4.15>t_2=2.084$	*
	blue fox	72.16 + 8.66		
underhair	blue frost fox	15.26 ± 3.06	$|t|=5.51>t_2=2.084$	*
	blue fox	23.97 + 5.31		

— Difference is not significant; * difference is significant.

Hair density

The hair density is 180.45 ± 33.43 per mm^2 in blue frost fox, 149.60 ± 28.05 per mm^2 and 203.55 ± 30.20 per mm^2.

Discussion

According to the quantitative indexes of blue frost fox, silver fox and blue fox, we come to a conclusion that the density of hair is the medium one. The qualitative characters make it superior to blue fox and silver fox, so it attracts the commercial attention. Due to the low input and high output, blue frost fox has a good perspective of artificial breeding in China.

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